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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/803,342	03/17/2004	C. Robert Koentzopoulos	LAM1P186/P1211	5586
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Beyer Law Group LLP P.O. BOX 1687 Cupertino, CA 95015-1687			EXAMINER ALANKO, ANITA KAREN	
			ART UNIT 1792	PAPER NUMBER
			MAIL DATE 06/25/2008	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/803,342

Applicant(s)

KOEMTZOPOULOS ET AL.

Examiner

Anita K. Alanko

Art Unit

1792

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) 15, 21 and 22 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 and 16-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SI-08)
Paper No(s)/Mail Date 3/17/04; 11/21/05
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

Election/Restrictions

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-14, 16-20, drawn to a method, classified in class 216, subclass 67.
- II. Claims 15 and 21, drawn to a product, classified in class 257, subclass 1+.
- III. Claim 22, drawn to an apparatus, classified in class 156, subclass 345+.

The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make another and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the product can be made by a different process such as one using a different etching composition.

Inventions I and III are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another and materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the apparatus can be used for a different method such as coating or etching with a different composition.

Inventions III and II are related as apparatus and product made. The inventions in this relationship are distinct if either or both of the following can be shown: (1) that the apparatus as claimed is not an obvious apparatus for making the product and the apparatus can be used for making a materially different product or (2) that the product as claimed can be made by another and materially different apparatus (MPEP § 806.05(g)). In this case apparatus can be used to

make a different product such as coating to form a coated substrate instead of etching to form an etched substrate.

Restriction for examination purposes as indicated is proper because all these inventions listed in this action are independent or distinct for the reasons given above and there would be a serious search and examination burden if restriction were not required because one or more of the following reasons apply:

- (a) the inventions have acquired a separate status in the art in view of their different classification;
- (b) the inventions have acquired a separate status in the art due to their recognized divergent subject matter;
- (c) the inventions require a different field of search (for example, searching different classes/subclasses or electronic resources, or employing different search queries);
- (d) the prior art applicable to one invention would not likely be applicable to another invention;
- (e) the inventions are likely to raise different non-prior art issues under 35 U.S.C. 101 and/or 35 U.S.C. 112, first paragraph.

Applicant is advised that the reply to this requirement to be complete must include (i) an election of a invention to be examined even though the requirement may be traversed (37 CFR 1.143) and (ii) identification of the claims encompassing the elected invention.

The election of an invention may be made with or without traverse. To reserve a right to petition, the election must be made with traverse. If the reply does not distinctly and specifically point out supposed errors in the restriction requirement, the election shall be treated as an

election without traverse. Traversal must be presented at the time of election in order to be considered timely. Failure to timely traverse the requirement will result in the loss of right to petition under 37 CFR 1.144. If claims are added after the election, applicant must indicate which of these claims are readable on the elected invention.

If claims are added after the election, applicant must indicate which of these claims are readable upon the elected invention.

Should applicant traverse on the ground that the inventions are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the inventions to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

During a telephone conversation with Michael Lee on June 17, 2008 a provisional election was made without traverse to prosecute the invention of Group I, claims 1-14, 16-20. Affirmation of this election must be made by applicant in replying to this Office action. Claims 15 and 21-22 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Vallon et al (JVST A 1997).

Vallon discloses a method for etching a stack (Fig.1) with at least one SiGe layer (see Fig.1) over a substrate (silicon substrate, Fig.1) in a processing chamber, comprising providing a silicon germanium etch, comprising:

providing an etchant gas into the processing chamber, wherein the etchant gas comprises HBr, an inert diluent (helium) and O₂ (page 1875, col.2, lines 2-3);

cooling the substrate to a temperature below 40 °C (25 °C, page 1875, col.2, line 2); and

transforming the etching gas to a plasma to etch the silicon germanium layer (page 1876, section III.A.)

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various

claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 2-14, 16-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bu (US 2004/0067631 A1) in view of EP 0200951 A2, Yang et al (US 6,451,647 B1) and kim et al (Electrochem. Soc. Proc. 1999).

Bu discloses a method of etching comprising:

etching [0057] a silicon cap 22 (Fig.6, approximately the same thickness as SiGe [0036]), SiGe layer 20, seed layer 18, which all overlie a silicon oxide layer 16 [0021] on silicon 14. However, Bu fails to disclose the etchants for the various layers.

The discussion of Vallon from above is repeated here.

As to claim 1, it would have been obvious to etch the SiGe layer with HBr, an inert diluent (helium) and O₂ and to cool the substrate to a temperature below 40 °C in the method of Bu because Vallon teaches that this is useful for patterning SiGe.

As to claim 2, EP 0200951 A2 teaches that an etchant gas of N₂, SF₆ and CHF₃ is useful for etching silicon at high rates and anisotropy (see abstract, col.4, lines 1-14). Kim teaches that doped and undoped polysilicon can be etched at the same rate (to form notch- and foot-free dual polysilicon gates) with SF₆ or to minimize isotropic etching effects a polymer-forming gas, HBr, is added to SF₆ (last paragraph of p.362, see also Table 1 on page 364). It is obvious to one with

ordinary skill in the art that a functionally useful alternative to HBr is a fluorocarbon, and it would have been obvious to use that in combination with sulfur hexafluoride as taught by EP 0200951 A2 to be useful for etching polysilicon.

Thus, it would have been obvious to break-through etch the silicon with N_2 , SF_6 and CHF_3 in the method of Vallon because EP 0200951 A2 teaches that it is a useful composition for etching silicon.

As to claim 3, Yang teaches that silicon may be etched with Cl_2 , HBr, CF_4 and O_2 (col.11, lines 20-22, 32-33; col.14, lines 7-10). It would have been obvious to main etch silicon with Cl_2 , HBr, CF_4 and O_2 in the modified method of Vallon because Yang teaches it is a useful etching composition for silicon.

Thus, as to claims 1-3, Vallon, EP 0200951 A2 and Yang all teach compositions for etching the layers cited in Bu that need to be etched. All of the etching compositions perform their same function of etching as they did separately. One of ordinary skill in the art would have recognized that the results of the combination were predictable, that of etching to form a patterned structure. Therefore, all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

As to claim 4, since the modified method of Bu is the same as the instant invention, the same results are expected.

As to claims 5-6, Bu discloses a seed layer 10 nm thick ([0022]).

As to claims 7-8, Bu discloses to use photolithography and etching [0037], but fails to disclose a 193 nm or higher generation photoresist. It would have been obvious to one with ordinary skill in the art to use the photoresist as cited in the method of Bu because it is a conventional photoresist and is expected to yield the predictable result of enabling patterning of the stack.

As to claim 9, Kim teaches that doped and undoped regions may be present, which is obvious to include in the structure of Bu in order to form a polysilicon gate useful for integrated circuits.

As to claim 10, the thickness of the seed and SiGe layer is approximately the same as that of the polysilicon [0036]. It is obvious to vary the thickness to that cited in order to optimize the final product for best results.

As to claims 11-14, see the rejection of claims 5-8.

As to claims 16-20, see the rejection of claims 2-3, 7-8.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anita K. Alanko whose telephone number is 571-272-1458. The examiner can normally be reached on Mon-Fri until 3:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571-272-1465. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Anita K Alanko/
Primary Examiner
Art Unit 1792